Developing a viable electric bus service: the Milton Keynes demonstration project

Conference or Workshop Item

Developing a viable electric bus service: the Milton Keynes demonstration project

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The potential of electric buses

- EVs are roughly twice the price of diesel vehicles, but can recoup the cost in lower fuel and maintenance costs if utilisation is high
- Buses would seem an ideal application – high utilisation; predictable use cycles; limited infrastructure needs
- In practice, electric buses have only had subsidised niche applications

Diesel remains dominant

- Policy concentrates on infrastructure and purchase subsidies
- Assumes market will respond to EVs (including buses)
- There has been a gradual acceptance that hybrids are commercially viable due to 35-40% fuel saving and lower maintenance costs
- Uptake slow but happening in some areas (Oxford prime example in commercial market; London under franchise system)
- For other low carbon bus technologies, high capital costs, effects on operational practices and risk uncertainties stop investment
- So need to address institutional as well as technical and cost issues

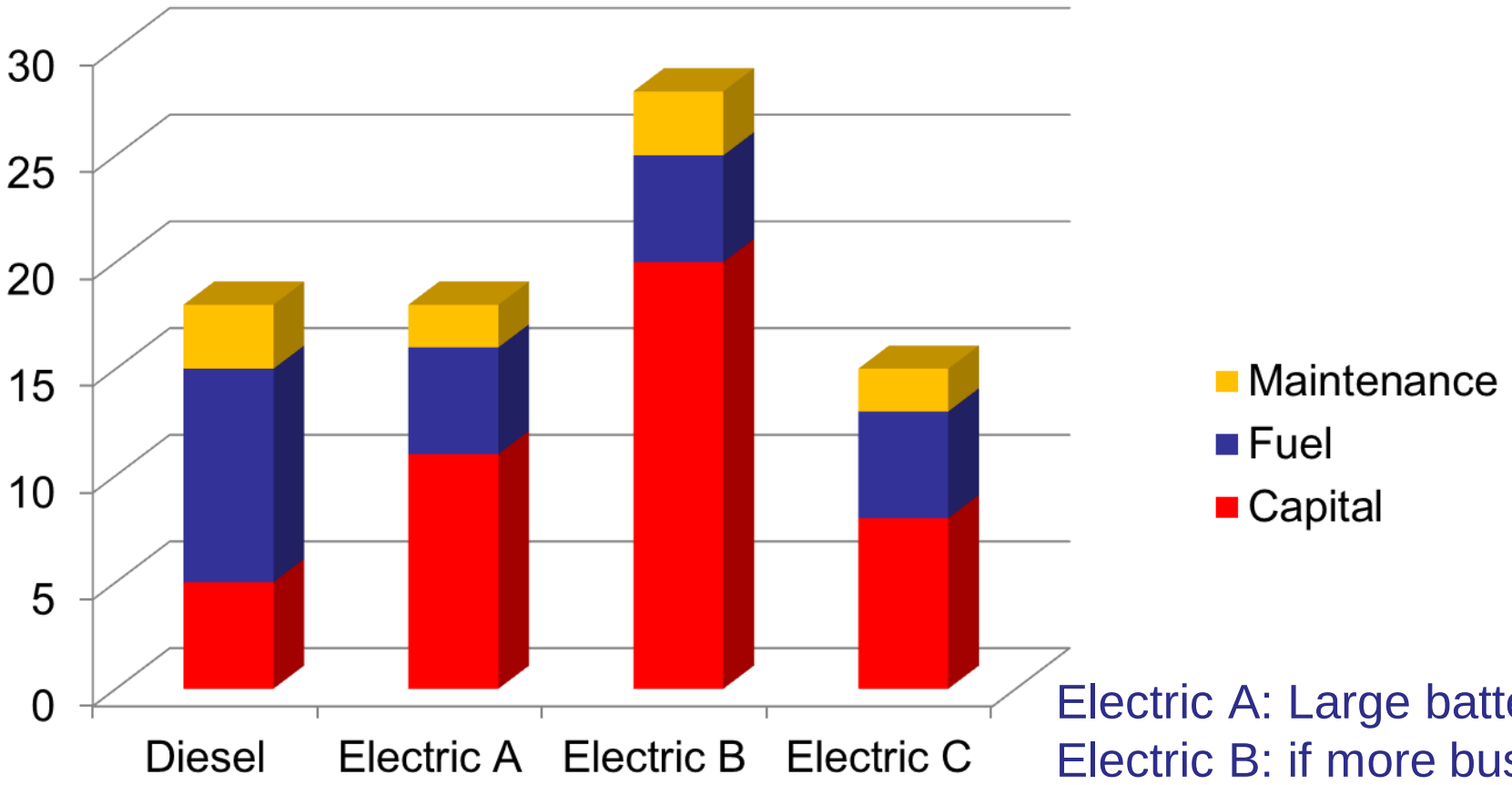
Three design specification levels

1. Product design (technical and financial)
2. Sensitivity to operational system and practices
3. Business model to manage risk and provide confidence to innovate
   - Policy and research has tended to major on only the first

- All three are needed for innovation to take root
- Milton Keynes electric bus demonstration project seeks to address all three levels

Level 1: Financial

confidence and risk



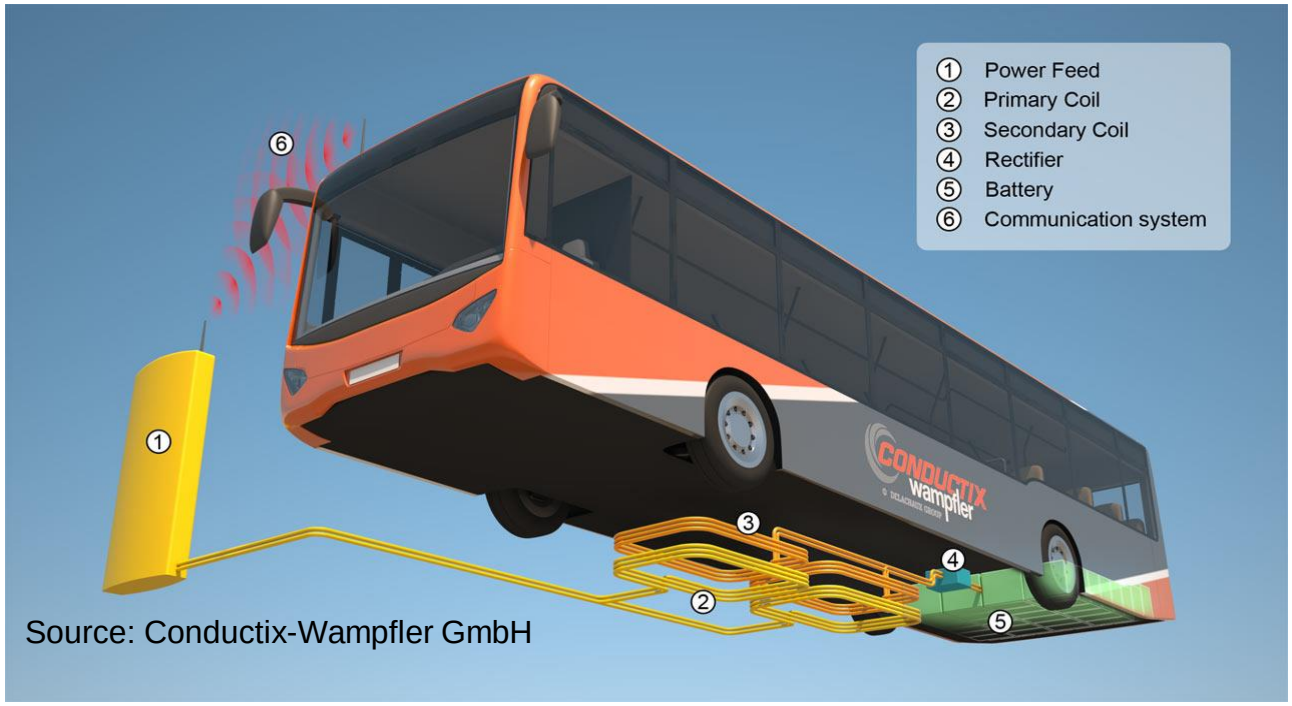
Indicative cost units for 5 year use of a bus

Electric A: Large battery bus
Electric B: if more buses needed or early battery replacement
Electric C: 1:1 replacement and smaller battery

Level 1: Technical

Wireless inductive charging

- No cable connection (operational practice)
- Delivers very high power ratings (typically 120 kW) at high efficiency of transfer (90%+)
- Proven system in public operation (Turin)

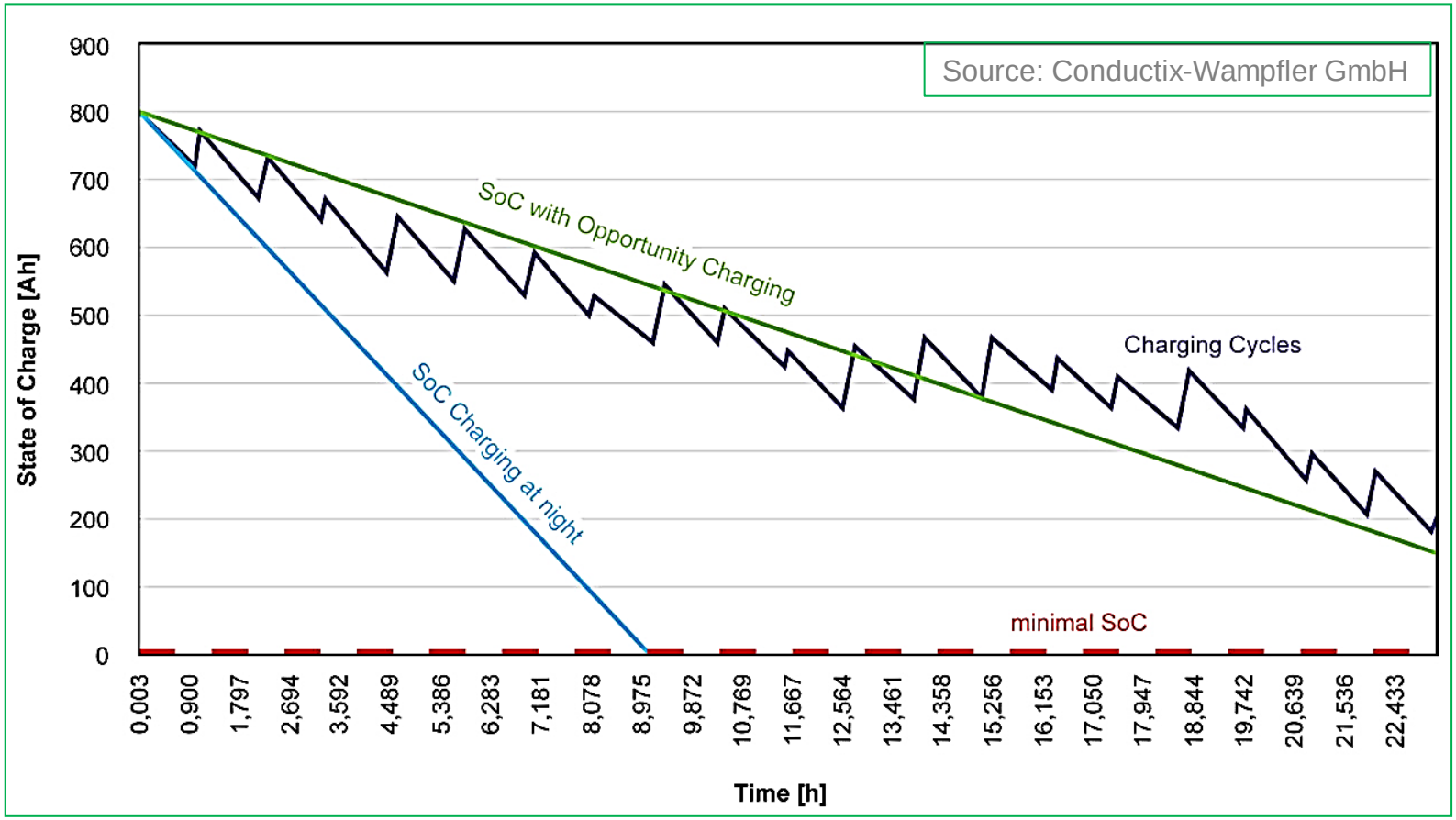


Source: Conductix-Wampfler GmbH

Level 1: Technical

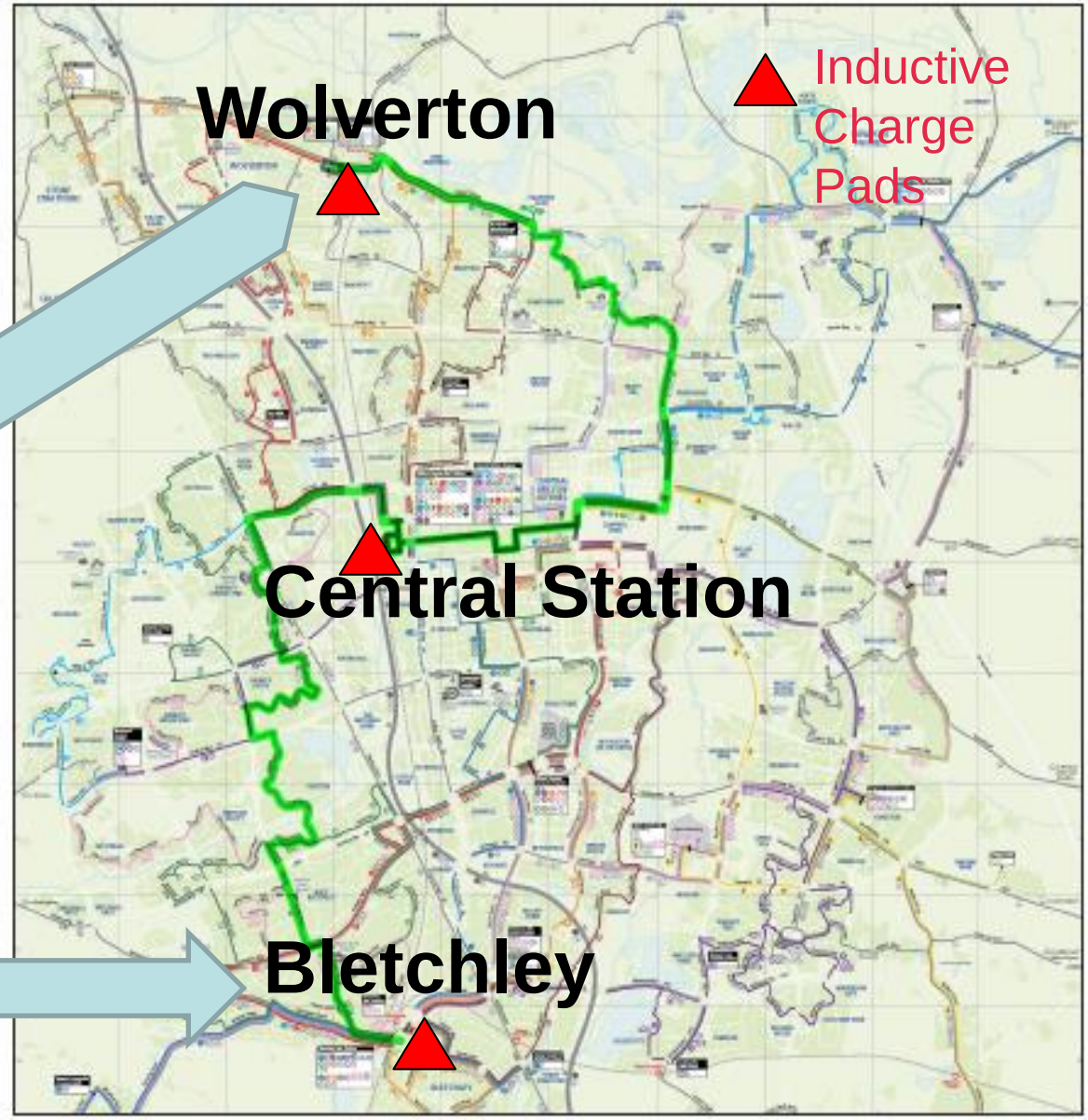
Opportunity charging

- At timetabled layover points (operational practice)
- This significantly increases vehicle range and enables use of a lower capacity battery (160KWh for MK)



Milton Keynes Demo Route

Route 7: 24km, 750,000 passenger journeys/year;
Starting operations December 2nd



Business model for transition

- No individual actor in system willing to take financial risk
  - Uncertainties are financial, technical and mix of new business relationships involved
- An enabling company was established that finances the project and removes risk from other actors
- The enabling company invests in infrastructure and buses (including obtaining Green Bus Grant and grant towards infrastructure)
- It leases buses in normal way to Arriva which includes access to inductive chargers and electricity. This matches cost of leasing diesel bus plus fuel
- Provides confidence to innovate and a structure in which learning and trust can develop

Conclusions

- We need a policy approach that understands institutional factors in technological transition
- Mass electrification of buses is a real possibility
- Widespread implications – imagine an electric BRT!!
- We need policies that support all three levels of innovation transition
- Policy concentrating on a risk management system could be very effective
- A focus on business process for innovation is crucial – but is not the government culture for transport policy